

**REMARKS:**

In the outstanding Office Action, the Examiner rejected claims 1-11. Claim 1 is amended herein, and new claims 12 and 13 are added. No new matter is presented. Thus, claims 1-13 are pending and under consideration. The rejections are traversed below.

**REJECTION UNDER 35 U.S.C. § 102(b):**

Claims 1-3, 5 and 6 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,249,598 (Honda).

Independent claim 1 recites inputting "design information of an inspection object" and "an inspection standard specifying a defective range on solder amount or solder wetting amount", including calculating "shape information of a plurality of virtual solder fillets based on said design information" and "an inspection image according to said shape information of said virtual solder fillets." Claim 1 further recites, "calculating characteristic amounts of virtual solder shapes from said inspection images" and "determining means for determining whether the virtual solder shapes are defective or nondefective from said shape information of said virtual solder fillets by using said inspection standard."

As such, the invention of claim 1 provides, "said characteristic amounts of said virtual solder shapes and a result of defective/nondefective determination to compare said characteristic amounts with said result of defective/nondefective determination to thereby determine a threshold value of said characteristic amount."

Honda is directed to identifying design shape factors of leads and pads as standard shape characterizing amounts, and extracting the standard shape characterizing amounts from the accumulated shape characterizing amounts for soldered portions (see, col. 2, lines 32-38 and col. 5, lines 44-53). However, Honda simply detects shapes and dimensions of leads and pads of electronic components from images, accumulates detection results and determines standard shape characterizing amounts for actual shapes (see, col. 7, lines 1-12).

Honda does not disclose or suggest the above discussed features of claim 1 including "calculating shape information of a plurality of virtual solder fillets based on said design information and an inspection image according to said shape information of said virtual solder fillets" for generating inspection data. Accordingly, Honda does not disclose every element of the Applicants' claim 1. In order for a reference to anticipate a claim, the reference must teach each and every element of the claim (MPEP §2131). Therefore, since Honda does not disclose

the features recited in independent claim 1, as stated above, it is respectfully submitted that claim 1 patentably distinguishes over Honda, and withdrawal of the §102(b) rejection is earnestly and respectfully solicited.

For at least the above-mentioned reasons, claims depending from independent claim 1 are patentably distinguishable over Honda. The dependent claims are also independently patentable. For example, as recited in claim 2, the design information includes “a component shape and a land shape, and said solder shape calculating means calculates a plurality of solder shape data according to said component shape and said land shape input.” Honda does not teach or suggest the claimed characteristic amount calculating device where the design information includes, “a component shape and a land shape, and said solder shape calculating means calculates a plurality of solder shape data according to said component shape and said land shape input”, as recited in claim 2.

Therefore, withdrawal of the rejection is respectfully requested.

**REJECTION UNDER 35 U.S.C. §103(a):**

Claims 4 and 7-11 are rejected under 35 U.S.C. § 103(a) as being unpatentable over various combinations of the following: Honda, U.S. Patent No. 4,876,455 (Sanderson), U.S. Patent No. 3,665,367 (Keller), U.S. Patent No. 5,064,291 (Reiser), U.S. Patent Pub. No. 2003/0021718 (Munekata), and U.S. Patent No. 5,164,994 (Bushroe).

As mentioned above, claim 1 patentably distinguishes over Honda (claims 4 and 7-11 depend from claim 1).

Further, as Honda merely discusses accumulating detection results and determining standard shape characterizing amounts for actual shapes therefrom, Sanderson does not cure the deficiencies of Honda regarding claim 4 of the present application.

In particular, Sanderson is limited to determining the quality of a specular soldered joint through examination of the shape of the joint surface using a series of point light sources where a binary grid map is generated using intensity values from the light responsive transducer array (see, col. 2, lines 61-68 and Figs. 2A and 2B).

However, Sanderson does not teach or suggest calculating “three-dimensional coordinate data using a fillet curve showing the contour of said solder fillet, a wicking curve showing a solder wicking condition on a component surface, and a spreading curve showing a solder spreading condition on a land surface”, as recited in claim 4.

Keller, Reiser, Munekata, and Bushroe do not add anything to the teachings of Honda and Sanderson with respect to the claimed invention, instead, Keller, Reiser, Munekata, and Bushroe merely discuss general standards for measurement or determination.

Keller merely discusses inspection standards for securing an electrical wire where an amount of solder is dependent on government inspection standards of soldered terminals used in military applications (see, col. 5, lines 10-15), and Reiser discusses descriptors measuring the shape of color contours and intensities (see, col. 2, lines 6-21).

Similarly, Munekata is directed to testing wettability of each solder alloy using by the wetting balance test (meniscograph method) (see, paragraph 34), and Bushroe generally discusses measuring intensity of a solder strip of known thickness in the image where the system can set a threshold that is equal to this measured intensity of the solder strip (see, col. 2, lines 27-35).

None of the cited references teach or suggest the claimed characteristic amount calculating device for “virtual” inspection or testing including the features of claims 7-11.

Therefore, withdrawal of the rejection is respectfully requested.

**NEW CLAIMS:**

New claim 12 includes, “determining whether the virtual solder shape is defective or nondefective from said shape information of said virtual solder fillet by using said inspection standard” and “outputting the characteristic amount and a result of defective/nondefective determination to compare said characteristic amount with said result of defective/nondefective determination to thereby determine a threshold value of said characteristic amount.”

New claim 13 is added to recite, “generating inspection images for a plurality of virtual solder fillets based on input design information” and “calculating a threshold value for inspecting a soldered portion of a component by comparing calculated characteristic amounts of virtual solder shapes from the inspection images.”

None of the cited references teach or suggest the above discussed features of claims 12 and 13. Therefore, it is submitted that new claims 12 and 13 are patentably distinguishable over the cited references.

**CONCLUSION:**

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.


Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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